

WHAT IS CLAIMED IS:

1. Laser beam optics for a robot link (10) having a longitudinal axis (11), wherein a first beam path (12) of a first working laser beam (13) is arranged on the longitudinal axis (11) of the robot link (10), wherein the first beam path (12) is configured to be deflected at an end facing a workpiece into an axis-parallel second beam path (14), and wherein a third beam path (15) of a second working laser beam (16) is arranged axis-parallel to the first beam path (12) of the first working laser beam (13) in the robot link (10), the laser beam optics comprising:

first and second optical elements arranged successively in one of the first and second beam paths (12 or 14) of the first working laser beam (13) and configured to be transmissive to the first working laser beam (13) in a transmission direction toward a workpiece, wherein the two optical elements are adjusted relative to one another so as to compensate laser beam displacement (17) of the first working laser beam (13), and wherein the second optical element arranged downstream in the transmission direction is configured to receive the second working laser beam (16) and reflect the second working laser beam (16) toward the workpiece (18).

2. Laser beam optics according to claim 1, wherein:

the first optical element is a compensation plate (19) beam-transmissive for the first working laser beam;

the second optical element is a reflector plate (20) beam-transmissive

for the first working laser beam (13) but reflecting for the second working laser beam (16); and

the compensation plate (19) has an entry symmetry axis (19') for the first working laser beam (13) and the reflector plate (20) has an exit symmetry axis (20'') for the first working laser beam (13), wherein the entry symmetry axis (19') and the exit symmetry axis (20'') are aligned with one another.

3. Laser beam optics according to claim 1, wherein the first and second optical elements are arranged relative to one another at an angle (α) effecting compensation of the laser beam displacement (17).

4. Laser beam optics according to claim 1, wherein at least one of the first and second optical elements is comprised of two prisms which behave optically as a plate.

5. Laser beam optics according to claim 1, wherein the first and second optical elements are transmissive for CO₂ laser radiation.

6. Laser beam optics according to claim 1, wherein the second optical element is highly reflective for Nd:YAG laser radiation.

7. Laser beam optics according to claim 1, wherein the first and second optical elements are coated anti-reflectively at a beam entry side and a beam exit side, respectively.

8. Laser beam optics according to claim 1, wherein the second optical element has a reflector surface (20') facing the second working laser beam (16) and

coated so as to be highly reflective for the second working laser beam (16).

9. Laser beam optics according to claim 8, further comprising a deflection mirror (21) configured to feed the second working laser beam (16) to the second optical element, wherein the deflection mirror (21) is parallel to the reflector surface (20') of the second optical element.

10. Laser beam optics according to claim 9, further comprising a housing (22), wherein the first and second optical elements and the deflection mirror (21) are arranged in the housing (22).

11. Laser beam optics according to claim 10, wherein the housing (22) has a beam exit (23) and is arranged on an end face (24) of the robot link (10) facing the workpiece, wherein the housing (22) is provided, at a side facing away from the workpiece, with a first beam entrance (25) for the first working laser beam (13) and a second beam entrance (26) for the second working laser beam (16).

12. Laser beam optics according to claim 11, further comprising a beam displacement module (27) mounted on the housing (22) in the area of the first beam entrance (25) and comprising a first displacement mirror (28) within the first beam path (12) and a second displacement mirror (29) at the beginning of the second beam path (14).

13. Laser beam optics according to claim 11, further comprising an element support (31) configured to receive the first and second optical elements, wherein the housing (22) has a mounting cutout (30) within the second beam path

(14) and wherein the element support (31) with the first and second optical elements is mounted in the mounting cutout (31).

14. Laser beam optics according to claim 13, wherein the deflection mirror (21) is secured on an exterior wall (32) of the housing (22), wherein the exterior wall (32) extends parallel to a wall (30) of the mounting cutout (30) at a side facing the workpiece.

15. Laser beam optics according to claim 1, further comprising a fourth beam path (33), beginning at the second optical element and common to the first and second working laser beams (13, 16), wherein the second beam path (16) and the fourth beam path (33) are arranged in a plane, defined by the longitudinal axis (11) of the robot link (10) and a pivot axis (34) perpendicular thereto of an additional robot link (35), and at a predetermined spacing (59) from the longitudinal axis (11) of the robot link (12).

16. Laser optics according to claim 1, further comprising a housing (22), wherein the first and second optical elements are arranged in the housing (22).

17. Laser beam optics according to claim 16, wherein the housing (22) has a beam exit (23) and is arranged on an end face (24) of the robot link (10) facing the workpiece, wherein the housing (22) is provided, at a side facing away from the workpiece, with a first beam entrance (25) for the first working laser beam (13) and a second beam entrance (26) for the second working laser beam (16).

18. Laser beam optics according to claim 17, further comprising a beam

displacement module (27) mounted on the housing (22) in the area of the first beam entrance (25) and comprising a first displacement mirror (28) within the first beam path (12) and a second displacement mirror (29) at the beginning of the second beam path (14).

19. Laser beam optics according to claim 18, further comprising an element support (31) configured to receive the first and second optical elements, wherein the housing (22) has a mounting cutout (30) within the second beam path (14) and wherein the element support (31) with the optical elements is mounted in the mounting cutout (31).